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ABSTRACT

It is proposed that visual literacy be defined as the ability to understand (read) and use (write) images and to think and learn in terms of images. This definition includes three basic principles: (1) visuals are a language and thus analogous to verbal language; (2) a visually literate person should be able to understand (read) images and use (write) visual language; and (3) a visually literate person should be able to process information visually in order to think visually. Noting that the third principle is supported by research findings, it is argued that teaching students to be visually literate involves sharing mental strategies or processes that use mental imagery, visualization, mnemonics, dual coding, and symbolic systems to store information, interpret and develop ideas, solve problems, and process information. It is suggested that it is time to take another step toward the management of information by teaching people strategies and methods for thinking visually. An extensive bibliography is appended. (Author/MER)

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VISUAL LITERACY AND VISUAL THINKING

by

John A. Hortin

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Visual Literacy and Visual Thinking

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In our society, visual media surround us and influence us daily (Ausburn & Ausburn, 1978, p. 292). Effective education means that we can understand, use and appreciate the wealth of visual media available to us: we become visually literate. But there is confusion on what being visually literate means, and a primary reason for this confusion is that visual literacy is an area of knowledge claimed by many diverse groups (Ausburn & Ausburn, 1978, p. 291; Debes, 1969, p. 25; Johnson, 1977, p. 55). In fact, Debes (1968) explained that an understanding of visual literacy "is based on the confluence of knowledge, theory, and technology in many areas" (p. 963). While each group has some idea of what is meant by the term visual literacy, no one has yet fully developed a theoretical foundation. The definition of visual literacy keeps changing to fit the diverse groups' needs and becomes a complex and perplexing concept. Randhawa, Back, and Myers (1977) wrote:

> The use of the term 'visual literacy' has substantially increased since the First International Visual Literacy Conference was held in 1969; however, the construct lacks clear definition. The nature and constituents of this construct need to be well articulated so that practical application and research have a focus. (p. 1)

Johnson (1977) wrote, "Debes's efforts to define visual literacy and to clarify its instructional significance have been inconclusive" (p. 16). However, many sources exist for organizing a theoretical foundation for visual literacy. Clark and Clark reported, "Visual Literacy has a much wider and richer theoretical context than is usually brought to the attention of the people trying to understand the concept" (1976, p. 4). Clark and Clark (1976, p. 4) claimed a greater degree of understanding and acceptance of the visual literacy concept would result if this wider context of the theoretical foundations were explained.

A coherent, perceptive analysis of the the theoretical origins and philosophy of visual literacy would be useful. As Hill, who wrote Learning: A Survey of Psychological Interpretations, commented:

> For most of us, the various learning theories have two chief values. One is providing us with a vocabulary and a conceptual framework for interpreting the examples of learning that we observe. These are valuable for anyone who is alert to the world. The other, closely related, is in suggesting where to look for solutions to practical problems. The theories do not give us solutions, but they do direct our attention to those variables that are crucial in finding solutions. (1977, p. 261)

The many groups involved with visual literacy have borrowed theories from the developmentalists, cognitive style psychologists, perceptionists, transformational grammarians, the left- and right-brain hemispheric researchers. People such as Debes, Williams, Turbayne, Moffett, Fearing, Buber, Mead, Chomsky, Fries, Arnheim, and McKim (Amey, 1976; Ausburn & Ausburn, 1978; Debes, 1968, 1969, 1972, 1974a, 1974b; Fransecky & Debes, 1972; Randhawa, 1971; Williams & Debes, 1970) have left their imprints on the development of the visual literacy concept.

Almost all the major ideas and concepts of visual literacy can be traced to four areas of study: linguistics, art, psychology and philosophy (see Figure 1). A link between theories from these four areas to theories in visual literacy has been attempted by the visual literacy proponents. An example would be in the area of linguistics. Fries (1952) suggested that the meaning in verbal language was derived from the study of verbal structure and elements. Fries's (1952) ideas became a rationale for visual literacy training. According to visual literacy advocates, the study of visual elements such as color, form, syntax and composition, would enable an individual to find meaning in visual information. Understanding verbal elements to derive meaning was

analogous to understanding visual elements to understand visual information, visual literacy proponents claimed, thus providing a rationale for visual literacy training.

Linguistics also contributed to the building of visual literacy theory with the ideas of Chomsky (1957, 1964, 1968, 1975), who coined the term universal grammar. Proponents of visual literacy have suggested that if there are universals in verbal language, there are universals in visual language as well (Gozemba, 1975, pp. 12-13). Fries (1952) provided the theory that meaning could be derived from the study of elements, while Chomsky's ideas of a universal or innate language justified the teaching of certain universal elements in visual language. If such visual elements exist, the recognition of those elements is an important step toward becoming visually literate.

In the area of psychology, the research of the perceptionists has had a strong influence on visual literacy theory. The connection between the eye and the mind is the focal point of the perceptionists' theory. The transactionalists believe that perception itself "is a form of learning" (Amey, 1976, p. 14). Gibson (1954) stressed experience as necessary in the development of visual perception. Both Gibson (1954) and the transactionalists provide some link to visual literacy training.

Mead, Fearing and Buber espoused the importance of "mind" in perception (Amey, 1976, p. 21). This belief has led some visual literacy proponents to the increasingly popular position of using left- and right-brain hemispheric research to support visual literacy theory. However, an emphasis on just left- and right-brain hemispheric research should be avoided. Rather, a broader perspective is necessary, one that would result from more investigation in

other areas of mind research including brain chemistry, psychobiology, unconscious intellect, visualization, biofeedback and mind-body connection. Mental processing of information both verbal and visual needs to be studied further before a substantive theoretical foundation can be formulated. The future of visual literacy most likely lies with the research being conducted on the brain as suggested by Brown (1980) in her book, Supermind.

The philosopher Turbayne (1962, 1970a) had the most influence on the development of a theoretical foundation for visual literacy. His defense of a visual language is the first step in justifying the analogy between visual language and verbal language. For most visual literacy advocates, once this analogy is established, the term visual literacy becomes relevant. However, it must be remembered that Turbayne's (1970a) book, The Myth of Metaphor, is really a study of the metaphor and not visual literacy. Turbayne (1970a) devotes most of the book to establishing a humanistic, rather than mechanistic, explanation of reality through the use of language metaphor. Just what relationship his language-methaphor view of the world has with visual literacy remains unclear. Nevertheless, visual literacy advocates like Fransecky and Debes (1972), Flory (1978), Evers (1969) and Barley (1971) have selectively borrowed from Turbayne (1962, 1970a, 1970b) to theorize about visual literacy.

Art's primary contribution in the development of a theoretical foundation for visual literacy is Arnheim's (1969) theory on visual thinking. Arnheim (1969) wrote, "Visual thinking calls, more broadly for the ability to see visual shapes as images of the patterns of forces that underlie our existence--the functioning of minds, of bodies or machines, the structure of societies or ideas" (p. 315). However, Arnheim (1969) warned his readers about trying "to establish an island of visual literacy in an ocean of blindness" (p. 307).

Visual literacy is a means to visual thinking, which is as much a processing of information as it is a knowledge of visual elements. Arnheim (1969) said that the comprehension of images cannot be taken lightly, nor do visual aids necessarily provide conditions for visual thinking. A visually literate person should be able to process information visually as well as verbally, and the processing of information visually might be called visual thinking. Hocking (1978) elaborated on visual thinking:

> Learning through visuals assumes the ability to think visually, although not all investigations are in agreement with this theory. Herbert Read's Education Through Art and Rudolf Arnheim's Visual Thinking make great claims for thinking through the sense of sight. Arnheim points to whole areas of contemplation which do not involve language: music, chess, architecture, and the higher reaches of nuclear physics. 'Literacy' can be defined as the capacity and skill to understand, manipulate and master language in order to convey, interpret and write messages; the development and use of literacy in the visual mode is referred to as Visual Literacy. (pp. 12-13)

McKim wrote Experiences in Visual Thinking, a theoretical source with practical applications for visual literacy. McKim (1972) stated:

> Visual thinking pervades all human activity, from the abstract and theoretical to the down-to-earth and everyday. An astronomer ponders a mysterious cosmic event; a football coach considers a new strategy; a motorist maneuvers his car along an unfamiliar freeway; all are thinking visually. You are in the midst of a dream; you are making order out of the disarray on your desk: you are thinking visually. (p. 6)

Flory (1978) made the important connection between visual language and visual thinking when he wrote, "If we can accept the premise that a visual language exists, we can easily extend to the notion that this language can be utilized for visual thinking" (p. 5). Haber (1970), Anderson (1974), Paivio (1969, 1971), Samples (1976), Bry (1978), Edwards (1979), McKim (1972), Knowlton (1966), Hadamard (1945), Patten (1973) and Canelos (1978) have all written about visual thinking. Haber's (1970) article, "How We Remember What We See,"

discusses the difference between linguistic (words and numbers) memory and pictorial (scenes and photographs) memory. Haber (1970) found that the recognition of pictures is essentially perfect (p. 105). The same conclusion was obtained by Wood (1974) in his experiment. Researchers and writers such as Paivio (1969, 1971), Anderson (1974) and Lorayne and Lucas (1974) have demonstrated the use of imagery as aiding to memory and facilitating learning.

Lorayne and Lucas (1974) wrote about the early Greek and Roman orators and how they applied memory systems to deliver their lengthy speeches:

> What they did, basically, was associate each thought of a speech to a part of their own homes. These were called 'loci,' or 'places.' The opening thought of a speech would, perhaps, be associated to the front door, the second thought to the foyer, the third to a piece of furniture in the foyer, and so on. When the orator wanted to remember his speech, thought for thought, he actually took a mental tour through his own home. Thinking of the front door reminded him of the first thought of his speech. It is from this 'place,' or 'loci' memory technique that we get the time-worn phrase 'in the first place.' (pp. 1-2)

Fleming (1977) described more mnemonic strategy:

> Paradoxically, some of the earliest and by now most reliable evidence regarding mental imagery came from studies of <u>verbal</u> learning. As ancient mnemonists and orators knew, a powerful strategy for associating two or more things is to picture them all together in the mind, preferably in some interactive relationship. For example, in controlled studies, subjects have been asked to recall arbitrary clusters of words such as: house, knife, rock, flower, elephant, apple. If directed to form a composite interactive image of these objects a subject might, for example, imagine an <u>elephant</u> lifting a <u>house</u> over his head with a <u>rock</u> falling from the foundation, one tusk shaped like a <u>knife</u> and impaling an apple, a basket of <u>flowers</u> held by his tail. (p. 45)

Bower (1972) found that subjects directed to form composite images, such as those above, frequently recall twice as many words as those subjects who rehearse the words in the traditional drill fashion.

Fleming (1977) said that "The facilitation of verbal learning by means of imagery processes appears to be a pervasive phenomenon" (p. 45). He suggested that since imagery is an effective memory aid, perhaps "imagery strategies for processing and storing information should be taught, together with other learning strategies, as an early and universal part of school curricula" (Fleming, 1977, p. 45). Debes (1968, 1975), Nuell (1971), Turbayne (1970a), Clark and Clark (1976) and Flory (1978) would concur with Fleming's statement. However, Fleming (1977) cautions that the research in imagery processes has been limited. The relationship between imagery process and verbal process is still unclear (Fleming, 1977, p. 46). Fleming (1977) wrote, "While it may appear self-evident that pictures facilitate learning, until we know more about the mechanisms and processes involved we are at risk in predicting when (which tasks, learners, content) pictorial types of signs are apt to be more effective in instruction than verbal or than a combination" (p. 47).

Salomon (1979) explored the idea that visualization processes could be taught. Salomon (1979) has written extensively in the area of symbolic systems, and symbolic systems theory is also relevant to the development of the visual literacy concept (Levie, 1978). Salomon (1979) says a symbol system is "a set of elements that refer in specifiable ways to domains of reference and are interrelated according to some syntactic rules or coventions" (p. 20). Salomon's (1979) research on symbolic systems was documented in his book, Interaction of Media, Cognition and Learning. Hortin (1980) summarized Salomon's findings:

1. When a person learns, he deals with the media's symbol system;

2. A learner gets different content and different meaning from different symbol systems;

3. A learner must make different mental transformations and use different mental skills with different symbol systems;

4. A learner uses certain coding elements and certain mental processes according to the kinds of information he wants to, should, or can learn;

5. We can cultivate in a learner specific mental skills by using coding elements of a symbol system to activate or supplant these skills;

6. A learner will learn something from exposure to media in an undirected learning situation, but he will learn the most in a directed situation. (p. 5)

Salomon and Cohen (1976) theorized that a coded message is never a raw message, but represents a format as well as content. The code used biases the information. Handling of coded messages has two requirements: "The activation of mental skills relevant to the psychological requirements of the representational format used in the message, and the acquisition of the knowledge entailed in the message" (Salomon & Cohen, 1976, p.6). Some ability is needed to handle the code of the information, whether it is verbal mediation or visual mediation. A strategy and training for learning or remembering visual information is a possible solution to handling some coded information.

Paivio (1971) reported on some memory experiments comparing pictures (imagery), abstract words and concrete words; he found "imagery-concreteness" a better predictor of memory performance than abstract words (p. 242). "The number of items correctly remembered in such tasks uniformly increases from abstract words, to concrete words, to pictures" (Paivio, 1971, p. 242). Paivio's (1971) research supports the view that either images or words, or both, serve as memory codes for remembering items effectively.

Paivio (1971) explained that dual coding aids in recall because items are stored in both the verbal and nonverbal code, or at least the items are experienced in both forms of coding (p. 207). Words are not only read or heard, but evoke referent images. For instance, if the subject knows that verbal recall will be required in an experiment, the subject may verbally label pictures

(Paivio, 1971, p. 207). "The increased availability of both codes increases the probability of item recall because the response can be retrieved from either code--one code could be forgotten during the retention interval, but verbal recall would still be possible provided that the other is retained" (Paivio, 1971, pp. 207-208). Such research linked with the left- and right-brain hemispheric research could have important implications for visual literacy. If the right side of the brain is image-oriented, then strategies in visual literacy could be used to help code items for that hemisphere to aid in memory. Verbal coding of the left-brain hemisphere could then be used in conjunction with the image coding of the right-brain hemisphere.

Related mnemonic and image memory studies include those of Canelos (1980), Hadamard (1945), Whorf (1976), Paivio (1976), Bower (1966), Hilgard and Bower (1975) and Collins and Quillian (1972). Fleming (1977) wrote:

> In sum, I assert that the way in which pictorial stimuli influence thought and memory processes is becoming an increasingly pivotal issue in the media field. It is also becoming a research and theory issue in other fields of education such as reading, cognitive development, special education, and vocational education. It may be necessary to generate new learning theories, new ways of thinking about learning, in order to explain and understand the memory effects of pictures. (pp. 48-49)

There is a connection between visual thinking and perception. Perception involves the active processing of information by the perceiver in response to stimulus (Murch, 1973). Important to perception are perceptual development and the need for experiences and training (Debes, 1968; Nuell, 1971; Vernon, 1952; Newhouse, 1977; and Gibson, 1954). Turbayne ((1970a), Taylor (1960), Dondis (1974), Gregory (1970) and others would agree that an important aspect of perceptual development is the understanding of visual elements that make up the visual stimuli. Visual elements and their subsequent composition are thought to be analogous to verbal language (Debes, 1970,

1972, 1975; Barley, 1971; Turbayne, 1970a; Flory, 1978; Ausburn & Ausburn, 1978; Lamberski, 1976; Whitsitt, 1976; and Dondis, 1973). Visual language, imagery, and symbolic systems are thought to be a means to visual thinking (Fleming, 1977; Salomon, 1979; Majure, 1976; Arnheim, 1966, 1969; Paivio, 1969, 1971; Samples, 1976; Bry, 1978; and others). As Jonassen and Fork (1975) wrote, "Visual thinking depends upon visual perception, sequentially combined with the formation of cognitive structures into a continuous process" (p. 1).

In developing a theory of visual literacy for this study, I propose a definition of visual literacy. I selected Ausburn and Ausburn's definition (1978) as a "working" definition because it was fairly current and simply stated and it encompassed many of the ideas of the members of the 22nd Annual Lake Okoboji Educational Media Leadership Conference, which concentrated on visual literacy.

Ausburn and Ausburn (1978) wrote, "Visual literacy can be defined as a group of skills which enables an individual to understand and use visuals for intentionally communicating with others" (p. 291). The two basic principles of visual literacy that Ausburn and Ausburn (1978) provided are:

> 1. Visuals are a language. Like verbal language, they have vocabulary, grammar, and syntax.
>
> 2. A visually literate person should be able to read and write visual language. (p. 291)

In light of recent research by Paivio (1971), Fleming (197), Salomon (1979), Bry (1978), Gross (1973, 1974), McKim (1972), Sheehan (1972), Samples (1976), Canelos (1978), and Jonassen and Fork (1976), I propose a third principle for this study. The third principle is:

> 3. A visually literate person whould be able to process information visually in order to think visually.

The third principle proposed for this study implies that a visually literate person can decide when visual thinking is appropriate, can process information using visual thinking techniques, and can use visual codes with verbal codes for memory and creative thought purposes.

Arnheim (1969) proposed the visual thinking concept in his book, Visual Thinking. It is curious that although visual thinking and Rudolph Arnheim's work have been discussed in relation to visual literacy, few experts in the field have incorporated Arnheim's (1969) term visual thinking into a definition. For instance, at the 22nd Annual Lake Okoboji Educational Media Leadership Conference, none of the members who were asked to give their definitions of visual literacy used the term visual thinking (Cureton & Cochran, 1976, pp. 109-111).

Taking Ausburn and Ausburn's (1978, 291) definition as a basis, I propose the following definition for visual literacy:

> Visual literacy is the ability to understand (read) and use (write) images and to think and learn in terms of images.

Thus the proposed definition includes three basic principles: (1) visuals are a language and thus analogous to verbal language, hence the term visual literacy; (2) a visually literate person should be able to understand (read) images and use (write) visual language (Ausburn & Ausburn, 1978, p. 291); (3) a visually literate person should be able to process information visually in order to think visually (Anderson, 1974; Arnheim, 1966, 1969; Brown, 1980; Bry, 1978; Canelos, 1980; Lorayne & Lucas, 1974; McKim, 1972; Paivio, 1969, 1971; Samples, 1975; Sheehan, 1972).

The work of many researchers supports the proposed third principle of visual literacy. McKim (1972) believed visual thinking could be taught and wrote about visual thinking exercises in creative and productive thinking.

For Samples (1976), visual thinking involved the right side of the brain or what he called the "metaphoric mind" (p. 2). Paivio (1969, 1971), Olson (1974), Gross (1973, 1974), Sheehan (1972), Salomon (1979) and Levie (1978) considered visual thinking as part of the process of decoding symbolic systems. Salomon (1979), Lorayne and Lucas (1974), Fleming (1977), Paivio (1971), and Canelos (1980) were interested in the mental processing aspect of visual thinking in terms of dual coding, mnemonics, and transfer from verbal to visual and back to verbal. Bry (1978) called visual thinking "visualization" or "movies-of-the-mind" and said, "Through our movies-of-the-mind, however, we can create a state of awareness in which we are not thinking about, or figuring out, or analyzing our experiences, but actually experiencing them directly" (p. 6).

In their book, Seeing With the Mind's Eye, Samuels and Samuels (1975) wrote at length on visualization. Visualization has been used for spiritual goals, materialistic goals, mental health and healing (p. 30). Bry (1978) described the use of healing visualization by Dr. Gerald Jampolsky for problems ranging from learning disabilities to leukemia (p. 86). Dr. Carl Simonton and Stephanie Simonton used visualization along with traditional therapy on cancer patients (Bry, 1978, pp. 68-69). Bry's (1978) theories on visualization have important ramifications for future research in visual literacy:

> As doctors and others now know from the science of biofeedback, the rate of our heartbeat and other body functions can be altered by changing what we are feeling and thinking. And as students of the mind are rediscovering from the writings of artists and scientists throughout history, solutions to seemingly insoluble problems can be found by turning in to our inner images. (p. 7)

Finally, Schiller (1976) wrote:

> Being visually literate is an aptitude. It is a capacity to use imagery (visual and manipulative impression and expression) to facilitate, deepen and complete comprehension and conceptual learning. By conceptual learning we mean the awareness of describable properties, relationsips and connections among all visible and invisible phenomena in human experience. (p. 4)

Teaching students to be visually literate therefore involves sharing mental strategies or processes that use mental imagery, visualization, mnemonics, dual coding and symbolic systems to store information, interpret and develop ideas, solve problems and process information. I suggest it is time to take another step toward the management of information by teaching people strategies and methods for thinking visually. Visually literacy is not only understanding and creating visual language; it is a means of visual thinking.

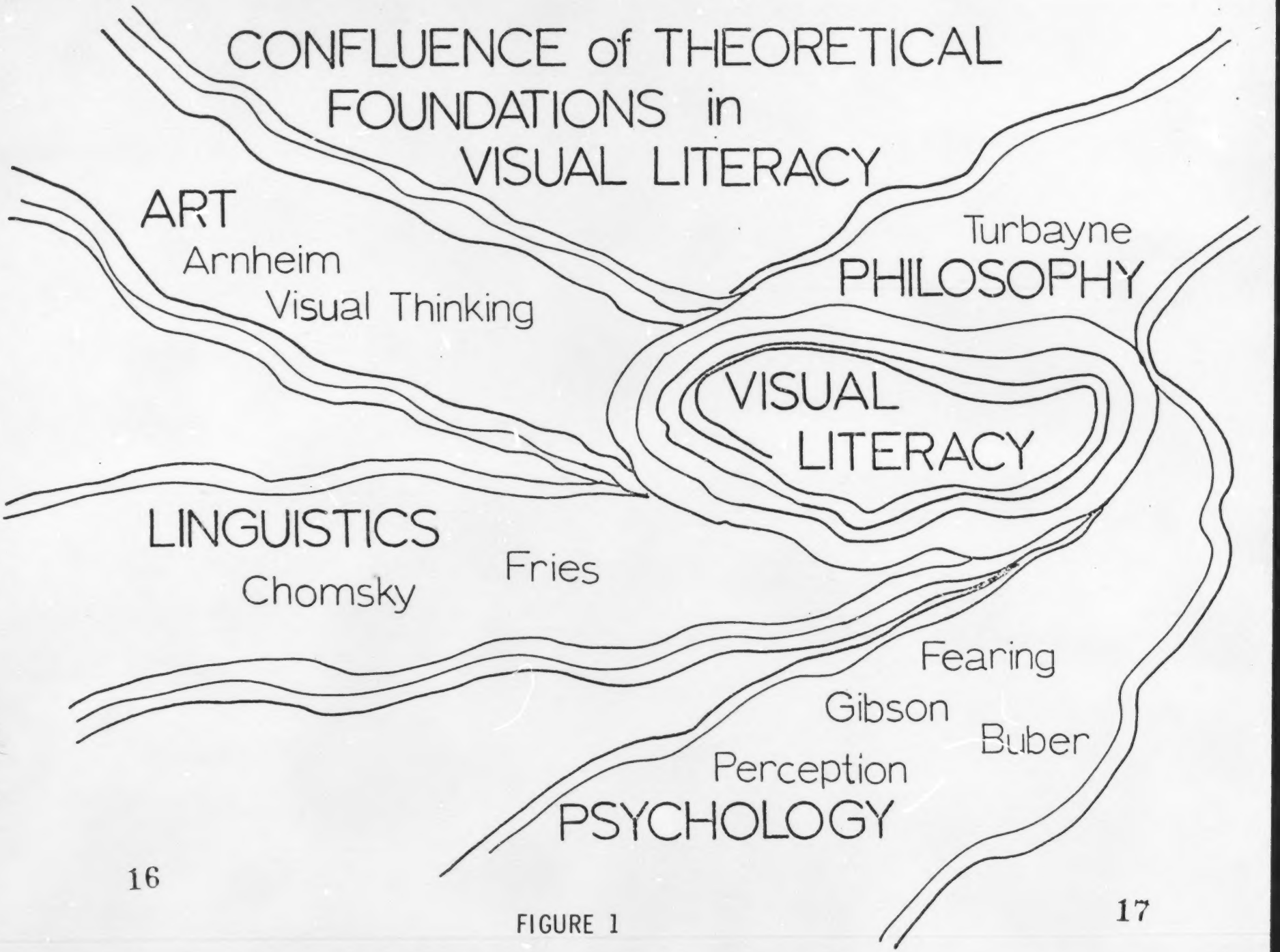
CONFLUENCE of THEORETICAL FOUNDATIONS in VISUAL LITERACY
ART
Arnheim
Visual Thinking
Turbayne
PHILOSOPHY
VISUAL LITERACY
LINGUISTICS
Chomsky
Fries
Fearing
Gibson
Buber
Perception
PSYCHOLOGY

FIGURE 1

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